

a display driver circuit within the housing and coupled to the central processing unit and the display, the display driver circuit forming images on the display for viewing by a user;

display control circuitry mounted on the housing and coupled to the display driver circuit, the display control circuitry allowing for user control of the display;

a servo coupled to the central processing unit and coupled to the display panel, the servo allowing adjustment of the position of the display relative to a user's eyes;

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cont'd

an external sensor module coupled to the central processing unit for providing data relating to an environment surrounding a user;

an internal sensor module coupled to the central processing unit for providing data relating to an environment between a user and a protective layer;

a lifesigns module coupled to the central processing unit for providing data regarding a user's bodily condition;

a lens within the display module that optically couples an image displayed on the display to an eye of a user for viewing by the user; and

a battery carried by the housing for powering the central processing unit, the transceiver, the receiver, the display, the light source, and the display driver circuit.

Please add new claims 108 and 109.

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108. (New) The device of claim 21 wherein the light source is positioned within the display module.

109. (New) The telephone of claim 40 wherein the light source is positioned within the display module.

REMARKS

Claims 21-29, 31-36, 38-48, 50-55, 57-59, 61, 63, 71-82 and 84-107 are pending in the application. All claims have been rejected under 35 U.S.C. § 103(a). In response, certain claims have been amended to more clearly recite the present invention.

New claims 108 and 109 have been added to recite that the light source is positioned within the display module. No new matter is introduced. Support for the amendments is found at least on page 17, line 22 through page 18, line 2 and page 27, lines 31-33.

Claims 21-29, 31-36, 38-48, 50-55, 57-59, 61, 63, 71-82, 84-85, 87-89, 91-93, 95-106 have been rejected under 35 U.S.C. § 103(a) as being unpatentable over Schoolman (U.S. Patent No. 5,281,957) in view of Ohnsorge (U.S. Patent No. 5,485,504), Spitzer (WO93/18428) and Nathanson (U.S. Patent No. 4,010,322). The rejections are respectfully traversed.

The Examiner suggests that Schoolman "discloses a portable communication device (or a telephone housing) comprising: a telephone housing (Fig. 4); a central processing unit (71, Fig. 10); a receiver (54) within the housing that receives image data; a liquid crystal display (44, 45); a display driver (3); a lens (33, 34) that enlarges an image displayed on the display for viewing by a user; and a display control (3)."

In addition, the Examiner cites Ohnsorge for teaching a telephone device comprising circuitry, a wireless transceiver, and a wireless receiver within a telephone housing. Spitzer and Nathanson are cited for teaching respectively an active matrix display and a power supply for a portable telecommunicator device.

The present invention, as recited in amended base claims 21, 40, 59, 71 and 107, is a portable communication device having a housing and a display module attached to the housing. In particular, the housing includes a central processing unit, a wireless transceiver, a wireless receiver, and a display driver circuit. The display module includes an active matrix liquid crystal display and a lens. The portable communication device also includes a battery carried by the housing.

Schoolman discusses a head-mounted display similar to a pair of glasses with liquid crystal display screens forming a portion of the eyeglass lens. In particular, as illustrated in Figures 2 and 3, the head-mounted display (21) comprises a frame (22) including a pair of ear pieces (24) and a hinged display panel (23). The display panel (23) comprises a left and a right liquid crystal display screen (25 and 26) and a corresponding pair of convex lenses (33 and 34). The display can be connected to a portable computer, which is self-contained and separate from the display. In addition, the computer is housed in a keyboard housing. (Schoolman, column 5, lines 1-3).

Ohnsorge discusses a radio telephone device having a telephone handset shaped housing. The device includes transducers, a keypad, and electronic circuitry. In addition, a video camera and a liquid crystal display are mounted in the housing and connected with the electronic circuitry to provide video communication.

The present invention, as claimed in amended base claims 21, 40, 59, 71 and 107, is not obvious because Schoolman fails to suggest a portable communication device comprising a housing and a display module attached to the housing, where the housing includes a central processing unit, a wireless transceiver, a wireless receiver and a display driver circuit, and the display module includes an active matrix liquid crystal display and a lens. Contrary to the Examiner's suggestion, Figure 4 of Schoolman does not show a housing for a portable communication device. Figure 4 merely illustrates a head mounted display (21) housing a pair of speakers (31) mounted on a head band (35), a boom microphone (32), an audio-video headset (36), and a display panel (23). There is no suggestion of a housing for the recited components. The only suggestion of a housing is made in column 5, lines 2-6, when Schoolman discusses a computer that is housed in a keyboard housing 11. However, the housing of Schoolman is separate from the head-mounted display and does not include a wireless transceiver or a wireless receiver, as recited in amended base claims 21, 40, 59, 71 and 107.

In further distinction, Schoolman fails to suggest a display module attached to a housing that includes an active matrix liquid crystal display and a lens. Schoolman does discuss a display panel 23 having a left and a right liquid crystal display screen (25 and 26) and a corresponding pair of convex lenses (33 and 34). However, there is no suggestion that the display panel (23) is attached to a housing that includes a central processing unit, a wireless transceiver, a wireless receiver, and a display driver circuit.

In fact, Schoolman teaches away from the present invention. The display panel (23) in Schoolman is attached to a frame (22), which only includes a pair of earpieces (24). As illustrated in Figure 10, the computer board or CPU (71) is located within an external electronic module that contains most of the display electronics needed to interface the display (2) with the computer (1). Thus, Schoolman teaches away from a portable communication device having a housing and a display module attached to the housing.

In addition, the present invention is not obvious because Ohnsorge also fails to suggest a portable communication device having a housing and a display module attached to the housing. Although Ohnsorge does discuss in Figure 2 a housing including a transducer, a camera, a wide angle lens, a video display, a keypad and a circuitry, it fails to suggest a display module attached to the housing including an active matrix liquid crystal display and a lens.

In fact, Ohnsorge teaches away from the present invention and shows a video display (6) and a wide angle lens (8) that are integral to the housing. Furthermore, the wide angle lens (8) in Ohnsorge is used as a video pickup device and not for optically coupling an image displayed on the display for viewing by a user, as recited in amended base claims 21, 40, 59, 71 and 107.

Similarly, Spitzer and Nathanson fail to add aspects of the present invention argued above to be lacking in Schoolman and Ohnsorge. That is, Spitzer and Nathanson do not teach a portable communication device having a housing and a display module attached to the housing, where the housing includes a central processing unit, a wireless transceiver, a wireless receiver and a display driver circuit, and the display module includes an active matrix liquid crystal display in a lens, as recited in amended base claims 21, 40, 59, 71 and 107.

In addition, the present invention is not obvious over Schoolman, Spitzer, Ohnsorge, or Nathanson because there is no suggestion to combine Schoolman, Spitzer, Ohnsorge or Nathanson to form a portable communication device having a housing and a display module attached to the housing, as claimed by the Applicants. Obviousness cannot be established by combining the teachings of the prior art to produce the claimed invention as a whole, absent some teaching, suggestion or incentive supporting the combination.¹

Schoolman does not teach combining a display module with a housing that includes a central processing unit, a wireless transceiver, a wireless receiver, and a driver circuit. To utilize the display of Schoolman, the user connects the display to a video connector of an external computer. The use of the head-mounted display with an external computer suggests that the central processing unit and display driver circuitry are external to the head-mounted display and provides no motivation to attach a housing including a central processing unit and a driver circuitry to the display module.

¹ *In re Geiger*, 815 F.2d 686, 2 U.S.P.Q. 2d 1276 (Fed. Cir. 1987); *In re Fine*, 837 F.2d 1071, 5 U.S.P.Q. 2d 1596 (Fed. Cir. 1988).

Schoolman also teaches away from the claimed invention. Schoolman explicitly requires three components: 1) a computer to generate faster scan computer images, 2) a display electronics module having a video monitor electronics to convert the raster images to a matrix format, and 3) a head-mountable display. The Applicants, in contrast have no need for a raster-to-matrix conversion because the display driver circuitry can be optimized with a matrix display. The Applicants' integration of a housing including the CPU display driver circuitry and a display module including a matrix display into a single portable unit is thus contrary to the teachings of Schoolman.

Ohnsorge also fails to teach combining a housing with a display module including an active matrix display and a lens. Ohnsorge discusses a radio telephone which includes a video display and lens that are integral to a housing. Thus, there is no motivation to place a display module including an active matrix liquid crystal display and a lens to a housing which includes a central processing unit and a display driver circuit.

Because neither Schoolman, Ohnsorge, Spitzer nor Nathanson neither alone or in combination teach all of the limitations of Applicants independent claims, as amended claims 21, 40, 59, 71 and 107 are not obvious over the cited prior art and should be allowed to issue. Claims 23-29, 32-36, 38-39, 87-89, 101 and 104 are dependent from claim 21; claims 42-48, 51-55, 57-58, 91-93, 102 and 105 are dependent from claim 40; claims 61 and 63 are dependent from claim 59; claims 72-82, 84-85, 95-100, 103 and 106 are dependent from claim 71, and thus follow. Reconsideration of the rejections is respectfully requested.

Claims 86, 90, 94 and 107 have been rejected under 35 U.S.C. 103(a) as being unpatentable over Schoolman in view of Ohnsorge, Spitzer and Nathanson and further in view of Suzuki. That rejection is respectfully traversed.

Remarks regarding references Schoolman, Ohnsorge, Spitzer and Nathanson apply to the rejection of claims 86, 90, 94 and 107.

Suzuki fails to add aspects of the present invention argued above to be lacking in Schoolman, Ohnsorge, Spitzer and Nathanson. That is, Suzuki does not teach a portable communication device having a housing which includes a central processing unit, a wireless transceiver, a wireless receiver and a display driver circuit and a display module attached to the housing which includes an active matrix liquid crystal display and a lens, as recited in amended base claims 21, 40, 59, 71 and 107.

In further distinction, Suzuki fails to suggest a servo coupled to the central processing unit, as recited in claims 86, 90, 94 and 107. As illustrated in Figure 4, Suzuki discusses an optical block distance adjusting mechanism including a pair of racks (31 and 32), a pinion, and a distance adjusting dial (34). There is no suggestion of providing the distance adjusting mechanism coupled to a central processing unit.

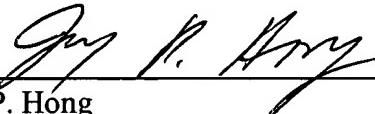
Thus, the invention as claimed is not made obvious by Schoolman, Ohnsorge, Spitzer, Nathanson and Suzuki or any combination thereof. Claim 86 is dependent from claim 21 and, claim 90 is dependent from claim 40, claim 94 is dependent from claim 71, and thus follow. As such, the rejection of Claims 86, 90, 94 and 107 under U.S.C. §103(a) is believed to be overcome by the foregoing remarks. Reconsideration of the rejections is respectfully requested.

CONCLUSION

In view of the above amendments and remarks, it is believed that all claims are in condition for allowance, and it is respectfully requested that the application be passed to issue. If the Examiner feels that a telephone conference would expedite prosecution of this case, the Examiner is invited to call the undersigned attorney at (978) 341-0036.

Respectfully submitted,

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MARKED UP VERSION OF AMENDMENTSClaim Amendments Under 37 C.F.R. § 1.121(c)(1)(ii)

21. (Fourth Amended) A portable communications device comprising:
- a housing;
 - a central processing unit mounted within the housing;
 - a wireless transceiver within the housing and coupled to the central processing unit for transmitting and receiving audio;
 - a wireless receiver within the housing and coupled to the central processing unit for receiving image data;
 - an active matrix liquid crystal display within a display module attached to the housing, the display having an active matrix circuit;
 - a light source [in the housing] that is optically coupled to the display, where light from the light source is directed onto the display;
 - a display driver circuit within the housing and coupled to the central processing unit and the display, the display driver circuit forming images on the display for viewing by a user;
 - a lens within the display module that optically couples an image displayed on the display to an eye of a user for viewing by the user; and
 - a battery carried by the housing for powering the central processing unit, the transceiver, the receiver, the display, the light source, and the display driver circuit.
23. (Thrice Amended) The device of Claim [22] 21 wherein the display module rotates relative to the housing.
32. (Amended) The device of Claim [31] 21 wherein the [backlight] light source comprises red, green and blue light sources.
34. (Amended) The device of Claim 21 wherein the display has an [the] array of transistors that is formed with a silicon-on-insulator (SOI) structure.

35. (Twice Amended) The device of Claim [22] 21 wherein the display module comprises a reflector positioned around [a backlight] the light source.
38. (Twice Amended) The device of Claim [22] 21 further comprising a flexible ribbon cable connecting the housing and the display module.
40. (Fourth Amended) A portable wireless telephone comprising:
 - a housing;
 - a central processing unit mounted within the housing;
 - a wireless receiver within the housing and coupled to the central processing unit for receiving audio and image data;
 - an active matrix liquid crystal display within a display module attached to the housing, the display having an active matrix circuit;
 - a light source [within the housing] that is optically coupled to the display such that light from the light source is directed onto the display;
 - a display driver circuit within the housing and coupled to the central processing unit and the display, the display driver circuit forming images on the display for viewing by a user;
 - a lens within the display module that optically couples an image displayed on the display to an eye of a user for viewing by the user; and
 - a battery within the housing for powering the central processing unit, the receiver, the display and the driver circuit.
42. (Thrice Amended) The telephone of Claim [41] 40 wherein the display module rotates relative to the housing.
51. (Twice Amended) The telephone of Claim [50] 40 wherein the [backlight] light source comprises red, green and blue light sources.

53. (Twice Amended) The telephone of Claim 40 wherein [the] the display has an array of transistors that is formed with a silicon-on-insulator (SOI) structure.
54. (Twice Amended) The telephone of Claim [41] 40 wherein the display module comprises a reflector positioned around [a backlight] the light source.
57. (Thrice Amended) The telephone of Claim [41] 40 further comprising a flexible ribbon cable connecting the housing and the display module.
59. (Fourth Amended) A method of operating a portable communications device comprising:
 - powering a central processing unit, a wireless receiver, a wireless transceiver, disposed within a [common] housing and an active matrix liquid crystal display within a display module attached to the housing by a battery in the housing;
 - operating display control circuitry in the housing to display an image, the display control circuitry being connected to a display driver circuit; and
 - viewing through a lens within the display module an optically coupled image of the displayed image.
71. (Thrice Amended) A portable wireless telephone comprising:
 - a housing;
 - a central processing unit mounted within the housing;
 - a wireless receiver within the housing and coupled to the central processing unit that receives audio and image data;
 - an active matrix liquid crystal display [within the housing and] coupled to the central processing unit and mounted within a display module, the display having an active matrix circuit;
 - a display driver circuit within the housing and coupled to the central processing unit and the display, the display driver circuit forming images on the display for viewing by a user;
 - a lens mounted within the display module that optically couples an image displayed on the display to an eye of a user for viewing by the user;

a light source mounted within the display module having red, green and blue elements and that directs red, green and blue light onto the display; and

a battery within the housing for powering the central processing unit, the receiver, the display, and the display driver circuit.

80. (Twice Amended) The telephone of Claim 71 wherein the display has an array of transistors that is formed with a silicon-on-insulator (SOI) structure.

107. (Amended) A portable communications device comprising:

a housing;

a central processing unit mounted within the housing;

a wireless transceiver within the housing and coupled to the central processing unit for transmitting and receiving audio;

a wireless receiver within the housing and coupled to the central processing unit for receiving image data;

an active matrix liquid crystal display within a display module attached to the housing and coupled to the central processing unit, the display having an active matrix circuit including an array of transistor circuits and an array of pixel electrodes such that the active matrix circuit is bonded to an optically transmissive substrate with an adhesive layer;

a light source [in the housing] within the display module that is optically coupled to the display where light from the light source is directed onto the display;

a display driver circuit within the housing and coupled to the central processing unit and the display, the display driver circuit forming images on the display for viewing by a user;

display control circuitry mounted on the housing and coupled to the display driver circuit, the display control circuitry allowing for user control of the display;

a servo coupled to the central processing unit and coupled to the display panel, the servo allowing adjustment of the position of the display relative to a user's eyes;

an external sensor module coupled to the central processing unit for providing data relating to an environment surrounding a user;

an internal sensor module coupled to the central processing unit for providing data relating to an environment between a user and a protective layer;

a lifesigns module coupled to the central processing unit for providing data regarding a user's bodily condition;

a lens within the display module that optically couples an image displayed on the display to an eye of a user for viewing by the user; and

a battery carried by the housing for powering the central processing unit, the transceiver, the receiver, the display, the light source, and the display driver circuit.